

Technical Manual
No. 5-814-2
Air Force Manual
AFM 88-11, Volume 2 }

DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
Washington, DC, 15 March 1985

**SANITARY AND INDUSTRIAL WASTEWATER COLLECTION-
PUMPING STATIONS AND FORCE MAINS**

		<i>Paragraph</i>	<i>Page</i>
Chapter 1.	GENERAL		
	Purpose and scope.....	1-1	1-1
	Special wastes	1-2	1-1
	Pump Station alternatives	1-3	1-1
Chapter 2.	LOCATION OF PUMPING STATIONS		
	Service area.....	2-1	2-1
	Site selection	2-2	2-1
	Building and site requirements	2-3	2-1
Chapter 3.	TYPE AND CAPACITY OF PUMPING STATIONS		
	Required pumping capacity	3-1	3-1
	Type of construction.....	3-2	3-1
Chapter 4.	WASTEWATER PUMPING EQUIPMENT		
	Wastewater pumps	4-1	4-1
	Pump drives.....	4-2	4-2
	Drive mechanisms	4-3	4-3
	Pump speed controls.....	4-4	4-3
Chapter 5.	PUMPING SYSTEM DESIGN		
	Force main hydraulics.....	5-1	5-1
	Pump analysis and selection	5-2	5-3
	Wet well design.....	5-3	5-5
	Pump controls and instrumentation	5-4	5-6
	Surge phenomena.....	5-5	5-7
	Screening and comminuting devices.....	5-6	5-9
Chapter 6.	PIPING, VALVES AND APPURTENANCES		
	Pipe materials, fittings, joints.....	6-1	6-1
	Valves and appurtenances	6-2	6-2
	Installation.....	6-3	6-2
Chapter 7.	PUMP STATION COMPONENTS		
	Construction requirements	7-1	7-1
	Heating and ventilation.....	7-2	7-1
	Electrical equipment and lighting.....	7-3	7-2
	Standby power	7-4	7-2
	Water supply.....	7-5	7-2
	Flow measurement.....	7-6	7-2
	Paints and protective coatings.....	7-7	7-3
Appendix A.	References.....		A-1
	Bibliography		BIBLIO-1

*This manual supersedes TM 5-814-2 dated 1 September 1958.

LIST OF FIGURES

Figure		Page
5-1.	Chart for Hazen-Williams formula	5-2
5-2.	Typical pump-system curves.....	5-5
5-3.	Pump suction connections to wet well	5-7

LIST OF TABLES

Table		Page
3-1.	Classification of pumping stations	3-1
5-1.	Minimum pump cycle times.....	5-6
5-2.	Required submergence depth to prevent vortexing	5-6
5-3.	Water hammer wave velocities	5-8